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2
3 I claim:

4 1. A down hole device comprising:

5 -an outer tubular member having a series of slots therein, said slots being arranged
6 about the exterior of said outer tubular member at an angle of inclination of between 25 degrees
7 to 45 degrees;

8 -an inner member disposed within said outer tubular member;

9 -means for moving said outer tubular member in a first direction in order to subject
10 the outer tubular member to a downward force so that the outer tubular member is expanded
11 along said slots.
12

13 2. The down hole device of claim 1 wherein said slots are arranged about said outer
14 tubular member in a spiral mode.
15

16 3. The down hole device of claim 1 wherein said slots are arranged about said outer
17 tubular member in a first spiral pattern which extends to a second spiral pattern.
18

19 4. The down hole device of claim 1 wherein said moving means comprises:

20 -a setting tool having a setting sleeve operatively associated with said outer tubular
21 member and a mandrel being connected to said inner member, and wherein said mandrel causes an
22 upward force against the bottom end of said outer tubular member and wherein said setting sleeve

1 causes a downward force against the top end of said outer tubular member so that said outer
2 tubular member expands.

3

4 5. The down hole device of claim 4 further comprising:

5 -ratchet means, disposed between said mandrel and said setting sleeve, for
6 allowing movement of said outer tubular member in a first direction but preventing movement in a
7 reverse direction.

8

9 6. The down hole device of claim 1 wherein said moving means comprises:

10 -a setting apparatus comprising: a setting sleeve connected to said outer tubular
11 member; a mandrel being connected to said inner member; a chamber positioned between said
12 outer tubular member and said inner tubular member; and wherein a pressure entering said
13 chamber causes an upward force to be applied to said mandrel and a downward force to be
14 applied to said setting sleeve so that said outer tubular member expands.

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16 7. The down hole device of claim 6 further comprising:

17 -stroke limit means for limiting the movement of said mandrel in a first direction.

18

19 8. A method of expanding an anchoring device within a casing, the anchoring device
20 comprising: an outer tubular member having a series of slots therein, said slots being arranged
21 about the exterior of said outer tubular member in a spiral pattern; an inner cylindrical member
22 disposed within said outer tubular member; the method comprising:

1 -lowering the anchoring device to the desired level;

2 -applying a first force to said inner cylindrical member in a first direction in order

3 to subject the inner tubular member to an upward force;

4 -applying a second force to said outer tubular member in a second direction in

5 order to subject the outer tubular member to a downward force;

6 -expanding said outer tubular member along said slots;

7 -engaging said outer tubular member against the inner wall of the casing.

8
9 9. The method of claim 8 wherein the anchoring device further comprises a setting
10 apparatus comprising: a setting sleeve connected to said outer tubular member; a mandrel being
11 connected to said inner cylindrical member; a chamber positioned between said outer setting
12 sleeve and said mandrel; and wherein the step of applying the first force and the second force
13 comprises:

14 -applying a pressure to said chamber;

15 -moving said setting sleeve downward in response to said hydraulic pressure.

16
17 10. The method of claim 9 wherein the anchoring device further comprises a ratchet
18 means, disposed between said setting sleeve and said mandrel, and wherein the step of moving
19 said setting sleeve further comprises:

20 -allowing movement of said setting sleeve in a first direction relative to said
21 mandrel but preventing movement in a reverse direction.

1 11. The method of claim 10 wherein said spiral pattern is arranged in a first direction.

2
3 12. The method of claim 10 wherein said spiral pattern is arranged in a first spiral
4 direction, and wherein said first spiral pattern extends to a second spiral direction.

5
6 13. The method of claim 10 wherein the anchoring device contains a plug device so that a
7 flow stream from the casing is prevented from flowing through the anchoring device.

8
9 14. The method of claim 10 wherein the anchoring device contains a one-way valve so
10 that a flow stream from the casing is allowed to flow in a first direction through the anchoring
11 device but is precluded from flowing in a second direction through the anchoring device.

12
13 15. The method of claim 10 wherein a cover material encases said outer tubular member
14 and the cover material comprises an elastomeric member disposed about the outer tubular
15 member and the step of engaging said outer tubular member against the inner wall of the casing
16 further comprises sealingly engaging the elastomeric member against the inner wall of the casing.

17
18 16. The method of claim 10 wherein the outer tubular member has attached thereto a
19 gravel pack screen and the method further comprises: placing a gravel pack slurry about the
20 gravel pack screen.

21
22 17. A down hole device disposed within a well bore, the down hole device comprising:

1 -an outer tubular having a series of spiral slots therein, said spiral slots being
2 arranged about the outer portion of said outer tubular;

3 -an inner tubular disposed within said outer tubular;

4 -means for moving said outer tubular in a first direction in order to engage the
5 shoulder so that a downward force is applied to the outer tubular thereby expanding the outer
6 tubular along said spiral slots;

7 -a cover material member disposed about said outer tubular.

8
9 18. The down hole device of claim 17 wherein said cover material is an elastomeric
10 member.

11
12 19. The down hole device of claim 18 wherein said moving means comprises:

13 -a setting tool having a setting sleeve connected to said outer tubular and a
14 mandrel being connected to said inner tubular, and wherein said mandrel causes an upward force
15 against the bottom end of said outer tubular and wherein said setting sleeve causes a downward
16 force against the top end of said outer tubular so that said outer tubular expands along said spiral
17 slots.

18
19 20. The down hole device of claim 19 wherein said spiral slots are arranged about said
20 outer tubular in a first spiral pattern and wherein said first spiral pattern extends to a second spiral
21 pattern.

1 21. The down hole device of claim 20 further comprising:

2 -stroke limit means, disposed between said setting sleeve and said mandrel, for
3 terminating the movement of the mandrel in a first direction.
4

5 22. The down hole device of claim 18 wherein said moving means comprises:

6 -a setting apparatus comprising: a setting sleeve connected to said outer tubular; a
7 mandrel being connected to said inner tubular; a chamber positioned between said outer tubular
8 and said inner tubular; and wherein a pressure entering said chamber causes said setting sleeve to
9 move downward and said mandrel to have applied an opposing force so that said outer tubular
10 expands along said spiral slots.
11

12 23. The down hole device of claim 22 further comprising:

13 -stroke limit means, disposed between said setting sleeve and said mandrel, for
14 terminating the movement of the mandrel in a first direction.
15

16 24. A method of expanding a down hole device within a well bore, the down hole device
17 comprising: an outer tubular member having a series of slots therein, said slots being arranged
18 about an exterior portion of said outer tubular member offset from the longitudinal axis of the
19 outer tubular member, and an inner cylindrical member disposed within said outer tubular
20 member; the method comprising:

21 -lowering the down hole device through an inner portion of a tubing, with the
22 tubing being concentrically disposed within the well bore;

1 -lowering the down hole device to the desired level within the well bore;

2 -applying a first force to said inner cylindrical member in order to subject the inner
3 cylindrical member to an upward force;

4 -moving said outer tubular member in a second direction in order to subject the
5 outer tubular member to a downward force;

6 -expanding the outer tubular member along said slots, and wherein said expanded
7 outer tubular member has an expanded outer diameter that is larger than the inner portion of the
8 tubing;

9 -contacting the exterior of said outer tubular member against the wall of the well
10 bore.

11
12 25. The method of claim 24 further comprising:

13 -lifting the down hole device within the well bore;

14 -cleaning the walls of the well bore with the exterior of said outer tubular member;

15 -pushing the down hole device down into the well bore;

16 -cleaning the walls of the well bore with the exterior of said outer tubular member.

17
18 26. The method of claim 24 wherein the down hole device further comprises a ratchet
19 means, operatively associated with said outer tubular member and said inner cylindrical member,
20 and the step of moving the outer tubular member further comprises:

21 -allowing movement of said outer tubular member in a first direction but
22 preventing movement in a reverse direction by said ratchet means.

1 27. The method of claim 24 wherein the down hole device further comprises a setting
2 apparatus comprising: an outer setting sleeve connected to said outer tubular member; a mandrel
3 being connected to said inner cylindrical member; a chamber positioned between said outer setting
4 sleeve and said mandrel; and wherein the step of moving said outer tubular member comprises:

5 -applying a pressure into said chamber;

6 -moving said outer setting sleeve downward in response to said pressure.

7
8 28. The method of claim 27 wherein said slots are arranged in a first spiral pattern.

9
10 29. The method of claim 27 wherein said slots are arranged in a first spiral pattern, and
11 wherein said first spiral pattern extends to a second spiral pattern.

12
13 30. The method of claim 24 wherein the down hole device contains a plug device so that
14 a flow stream from the well bore is prevented from flowing through the down hole device.

15
16 31. The method of claim 24 wherein the down hole device contains a one-way valve so
17 that a flow stream from the well bore is allowed to flow in a first direction but is precluded from
18 flowing in a second direction.

19
20 32. The method of claim 24 wherein an elastomeric member is disposed about the exterior
21 of the outer tubular member and the step of expanding said exterior of said outer tubular member
22 to engage the walls of the well bore further comprises sealingly engaging the elastomeric member

1 against the wall of the well bore.

2

3 33. The method of claim 24 wherein the outer tubular member has attached thereto a
4 gravel pack screen and the method further comprises pumping a gravel pack slurry about the
5 gravel pack screen.

6

7 34. A down hole device for use in a well bore, the down hole device comprising:

8 -an outer tubular member having a series of slots about the exterior of said outer
9 tubular member, said slots being arranged at an angle offset from the longitudinal center of axis of
10 the outer tubular member and wherein said outer tubular member has an outer diameter portion
11 less than an inner diameter portion of the well bore;

12 -an inner cylindrical member disposed within said outer tubular member;

13 -means for moving said outer tubular member in a first direction in order to subject
14 the outer tubular member to a first force thereby expanding the outer tubular member along said
15 slots so that said expanded outer tubular member contacts the wall of the well bore;

16 -a cover disposed about said outer tubular member.

17

18 35. The down hole device of claim 34 wherein said slots are arranged about said outer
19 tubular member in a spiral mode.

20

21 36 The down hole device of claim 35 wherein said slots are arranged about said outer
22 tubular member in a first spiral pattern and wherein said first spiral pattern extends to a second

1 spiral pattern.

2

3 37. The down hole device of claim 36 wherein said moving means comprises:

4 -a setting tool having a setting sleeve connected to said outer tubular member and
5 a mandrel being connected to said inner cylindrical member, and wherein said mandrel causes an
6 upward force against the bottom end of said outer tubular member and wherein said setting sleeve
7 causes a downward force against the top end of said outer tubular member so that said outer
8 tubular member expands.

9

10 38. The down hole device of claim 37 further comprising:

11 -ratchet means, disposed between said setting sleeve and said mandrel, for
12 allowing movement of said setting sleeve in a first direction but preventing movement of said
13 setting sleeve in a reverse direction.

14

15 39. The down hole device of claim 36 wherein said moving means comprises:

16 -a setting apparatus comprising: a setting sleeve connected to said outer tubular
17 member; a mandrel being connected to said inner tubular member; a chamber positioned between
18 said outer tubular member and said inner tubular member; and wherein a pressure entering said
19 chamber causes said setting sleeve to move downward so that said outer tubular member expands.

20

21 40. The down hole device of claim 39 further comprising an elastomeric member disposed
22 about said cover.

1 41. A method of setting a plug within a casing, the plug comprising: a first anchoring
2 device operatively associated with a second anchoring device, and wherein said second anchoring
3 device comprising: an outer tubular member having a series of spiral slots arranged about the
4 exterior of said outer tubular member, said outer tubular member being attached to said first
5 anchoring device; an inner member disposed within said outer tubular member; and wherein the
6 method comprises:

7 -lowering the plug to the desired level;

8 -setting the first anchoring device at the desired level;

9 -moving said outer tubular member in a first direction in order to subject the outer
10 tubular member to a downward force;

11 -expanding said outer tubular member along said slots;

12 -engaging the outer diameter of said outer tubular member against the inner wall of
13 the casing.
14

15 42. The method of claim 41 wherein said first anchoring device comprises a plurality of
16 extendable arms and the step of setting the first anchoring device includes extending the plurality
17 of arms to engage the wall of the casing and the method further comprises placing a slurry on the
18 plug.
19

20 43. The method of claim 42 wherein said spiral slots are arranged in a first direction.
21

22 44. The method of claim 42 wherein said spiral slots are arranged in a first spiral

1 direction, and wherein said first spiral direction extends to a second spiral direction.

2
3 45. The method of claim 41 wherein said first anchoring device comprises slip means
4 having projections thereon, and the step of setting the first anchoring device further comprises
5 partially embedding said projections within the wall of the casing in order to engage the wall of
6 the casing.

7
8 46. A method of gravel packing a subterranean zone penetrated by a casing, the method
9 comprising:

10 -lowering an anchoring device to the desired level, the anchoring device
11 comprising: an outer tubular member having a series of slots therein, said slots being arranged
12 about the exterior of said outer tubular member in a spiral pattern; an inner member disposed
13 within said outer tubular member, said anchoring device having a gravel pack screen attached at a
14 distal end;

15 -moving said outer tubular member in a first direction in order to subject the outer
16 tubular member to a downward force;

17 -expanding said outer tubular member along said slots;

18 -engaging the outer diameter of said outer tubular member against the inner wall of
19 the casing;

20 -placing a gravel pack slurry into the annulus of the casing.

21
22 47. The method of claim 46 wherein said anchoring device has a cover material disposed

1 about the outer tubular member and wherein the step of engaging the outer diameter of said outer
2 tubular member against the inner wall includes engaging said cover material against the inner wall.
3

4 48. The method of claim 47 wherein said cover material is made of a permeable material
5 and the method further comprises:

6 -flowing a portion of a production stream from the subterranean zone through said
7 permeable material;

8 -flowing the remaining portion of the production stream through an inner bore of
9 said anchoring device.
10

11 49. The method of claim 47 wherein said cover material is made of an impermeable
12 material and the method further comprises:

13 -sealingly engaging said impermeable material against the wall of the casing;

14 -flowing a production stream from the subterranean zone through an inner bore of
15 said anchoring device.
16

17 50. The method of claim 47 wherein said spiral pattern is arranged in a first direction.
18

19 51. The method of claim 47 wherein said spiral pattern is arranged in a first spiral
20 direction, and wherein said first spiral pattern extends to a second spiral direction.
21

22 52. An apparatus for use in a well comprising:

1 -a first anchor member;

2 -a second anchor member operatively associated with said first anchor member;

3 -setting tool means for setting said first anchor member and said second anchor
4 member within the well.

5
6 53. The apparatus of claim 52 wherein said second anchor member has contained thereon
7 a plurality of slots formed in a spiral pattern.

8
9 54. The apparatus of claim 53 wherein said first anchor member has a first inner member
10 and a first outer member and wherein said second anchor member has a second outer member
11 attached to said first inner member and a second inner member attached to said first inner member
12 and wherein said setting tool means includes first means for moving said first and second outer
13 members in a first direction and second means for moving said first and second inner members in
14 an opposing direction.

15
16 55. A method of gravel packing a subterranean zone penetrated by a casing, the method
17 comprising:

18 -placing a gravel pack screen within the casing, and wherein an annulus is formed
19 within the casing;

20 -placing a gravel pack slurry about said gravel pack screen;

21 -lowering an anchoring device to the desired level, the anchoring device
22 comprising: an outer tubular member having a series of slots therein, said slots being arranged

1 about the exterior of said outer tubular member in a spiral pattern; an inner member disposed
2 within said outer tubular member, said anchoring device having a gravel pack screen attached at a
3 distal end;
4 -latching a distal end of said anchoring device onto the top of said gravel pack
5 screen;
6 -moving said outer tubular member in a first direction in order to subject the outer
7 tubular member to a downward force;
8 -expanding said outer tubular member along said slots;
9 -engaging the outer diameter of said outer tubular member against the inner wall of
10 the casing.

11
12 56. The method of claim 55 wherein said anchoring device has a cover material disposed
13 about the outer tubular member and wherein the step of engaging the outer diameter of said outer
14 tubular member against the inner wall includes engaging said cover material against the inner wall.

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